



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,916	11/16/2001	Aki Suzuki	5988-036-27	7929

7590 08/11/2004

Supervisor, Patent Prosecution Services
PIPER MARBURY RUDNICK & WOLFE LLP
1200 Nineteenth Street, N.W.
Washington, DC 20036-2412

EXAMINER

WALKE, AMANDA C

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/987,916	Applicant(s) SUZUKI ET AL.	
	Examiner Amanda C Walke	Art Unit 1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, and 5--21 is/are rejected.
- 7) ☒ Claim(s) 2 and 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1752

DETAILED ACTION

The following is a non-final rejection because a new rejection over Kobayashi et al has been made.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5, 6, 8, 10, 13, 14, and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toshiaki et al. (JP 11-282163 in view of its English language abstract and based upon a spot translation by a PTO staff member; a full translation is not available at this time, but has been requested).

Toshiaki et al disclose a positive photosensitive composition comprising an acid generating compound and an alkali soluble photosensitive resin.

With respect to the photosensitive resin, the reference teaches that suitable monomers are those of formulas I, II, and III. Of the exemplified polymer resins of the reference, c's 1, 7-9, 12, 14-16, and 19-24 meet the limitations of the instant claims 1, 8-11, and 14. Polymers c 1, 7, 9, 14, 19, and 23 are employed in the examples of the reference. According to the examples, the cited polymers meet the limitations of the instant claim 13. On page 32 of the reference, it is taught that acid-decomposable dissolution inhibiting compounds such as those of the instant claims 17 and 18 are preferably employed in the material of the reference. The reference further teaches on page 49, that an acid diffusion controller such as a nitrogen-containing organic

Art Unit: 1752

compound is preferably included in the reference material , and in section [0153] of page 50, that suitable organic solvents include ethylene glycol monoethyl ether acetate, propylene glycol monomethyl ether acetate, methyl lactate, ethyl lactate, methyl methoxypropionate, and ethyl ethoxy propionate (instant claims 19-21).

With respect to the photoacid generator compound, the compound may be an oxazole derivative, S-triazine derivatives, an iodonium salt, a sulfonium salt, a disulfone derivative, or a diazodisulfone derivative, with sulfonium salts being preferred. These compounds may be used singly or in combination (claim 5).

One such compound, 4-11, which is employed in example 8 (see table on page 52) meets the structural limitations of the instant claim 1 for formula 1-a. However, the anion listed with the compound on page 24, does not, but given that the preferred anions of the reference are fluorine-substituted benzene sulfonic acid anion and a pentafluorobenzenesulfonice acid anion (which is paired with compound 4-7)(both meet the instant structural limitations for formula 1-b), it would have been obvious to one of ordinary skill in the art to replace the anion listed with 4-11 and replace it with either of the preferred anions with reasonable expectation of achieving a resist capable of reducing change of pattern forms and sensitivity (claim 3).

3. Claims 1, 5-11, 13-15, and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al (EP 908783) in view of Toshiaki et al.

Watanabe et al disclose a resist composition comprising an organic solvent, at least two polymers that are crosslinked , and a photoacid generator (page 32). The exemplified polymers of formulas 7 and 3b'-2 are of similar structure to those instantly claimed. Polymers 1-3, 5, and 8-15 meet the structural limitations of the instant claims 1, 8-11, 14, and 15. The solvents

Art Unit: 1752

suitable to be employed in the invention include propylene glycol monomethyl ether acetate, propylene glycol monoethyl ether acetate, methyl 3-methoxypropionate, ethyl lactate, and ethyl 3-ethoxypropionate ([0094] page 33). A basic compound such as a N-containing organic basic compound which suppresses the rate of diffusion when the acid generated by the photoacid generator diffuses in the resist is preferably included (page 35). A diisolution regulator that enhances the contrast maybe also be included. The compounds exemplified by the reference on pages 43-46 meet the structural limitations of the instant claim 18.

The photoacid generator (PAG) of the reference may be an onium salt, a diazomethane derivative, a glyoxime derivative, and/ or a disulfone derivative, and these compounds may be used singly or in combination (page 33 and page 34 [see line 57]). Preferred among these compounds are triphenyl sulfonium compounds. Most preferred is a combination of an onium salt with a diazomethane compound. The reference fails to teach the use of a sulfonium salt meeting the limitations of the instant claims.

Toshiaki et al has been discussed above. As discussed above, the reference discloses several triphenylsulfonium PAG compounds. One such compound, 4-11, which is employed in example 8 (see table on page 52) meets the structural limitations of the instant claim 1 for formula 1-a.

Given the teaching of the reference that this compound is a preferred onium salt PAG, and the teaching of Watanabe that known onium salts may be employed in the material of its invention, it would have been obvious to one of ordinary skill in the art to prepare the material of Watanabe et al choosing to use the preferred sulfonium salt 4-11 of Toshiaki et al with

Art Unit: 1752

reasonable expectation of achieving a material having high resolution, and plasma etching resistance.

4. Claims 1, 3, and 5-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (6,136,500) in view of Toshiaki et al.

Toshiaki et al has been discussed above.

Kobayashi et al disclose a positive resist composition comprising an organic solvent, an alkali-soluble resin, a photoacid generator (PAG) or combination of PAG compounds, or a negative resist composition which would comprise the above cited components and additionally a crosslinking agent (column 2, line 43- column 3, line 10). Resin (2) in column 6, meets the structural limitations of the instant claims 1 and 8-11. Also, that polymer preferably comprises additional monomeric units meeting the structural limitations of the instant claims 14-16. An alkali dissolution controller meeting the structural limitations of the instant claim 18. The resin composition also preferably comprises a nitrogen-containing organic compounds employed a acid diffusion controller, which would meet the limitations of the instant claims 19 and 20. The organic solvents employed include ethylene glycol monoalkyl ethers acetates, 3-alkoxypropionic acid esters, and 2-hydroxypropionic acid esters are preferred (column 23, lines 13-16). The reference teaches the preferred PAGs include onium salts, sulfone compounds, sulfonate compounds, sulfonimide compounds, and diazomethane compounds. The may be used singly or in combination. Particularly preferred PAGs include sulfonium salts and diazomethane compounds, thus it would have been obvious to one of ordinary skill in the art to prepare the resin of the reference employing a combination of PAGs as taught by the reference wherein that

Art Unit: 1752

combination comprises a sulfonium salt and diazomethane compound (see claim 9). The reference fails to specifically disclose the instantly claimed sulfonium PAG and anion.

Given the teaching of the reference that this compound is a preferred onium salt PAG, and the teaching of Kobayashi et al that known onium salts may be employed in the material of its invention, it would have been obvious to one of ordinary skill in the art to prepare the material of Kobayashi et al choosing to use the preferred sulfonium salt Toshiaki et al with reasonable expectation of achieving a resist having excellent resolution and pattern profile.

Allowable Subject Matter

5. Claims 2 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In light of the certified English translation of the foreign priority document, the rejections of claims 2 and 4 the primary references in view of Uenishi et al have been dropped. Therefore, the instant claims 2 and 4 are now allowable over the prior art of record as the prior art of record fails to teach or suggest to one of ordinary skill in the art to prepare a positive working resist comprising a sulfonium cation meeting the limitations of the instant claims 2 and/ or 4.

Response to Arguments

6. Applicant's arguments filed 5/27/2004 have been fully considered but they are not persuasive.

Applicant has argued that the Toshiaki et al reference fails to teach or suggest the instantly claimed resin composition. Specifically, applicant argues that the Toshiaki et al

Art Unit: 1752

reference provides no motivation for replacing the counter-anion of PAG 4-11 with that of PAG 4-7. As explained by the examiner in the previous office action, the reference teaches that the a preferred sulfonium cation of Toshiaki et al is compound, 4-11, which is employed in example 8 (see table on page 52) meets the structural limitations of the instant claim 1 for formula 1-a.

However, the anion listed with the compound on page 24, does not, but the reference provides a list of preferred anions of the reference that may be employed in combination with any of the cations. That list includes fluorine-substituted benzene sulfonic acid anion and a pentafluorobenzenesulfonice acid anion (which is paired with compound 4-7)(both meet the instant structural limitations for formula 1-b), it would have been obvious to one of ordinary skill in the art to replace the anion listed with 4-11 and replace it with either of the preferred anions with reasonable expectation of achieving a resist capable of reducing change of pattern forms and sensitivity (claim 3). Therefore, given the teachings of the reference, both the cation of PAG 4-11 and the anion of PAG 4-7 are preferred, and any of the preferred compounds may be used in combination, thus there is motivation in the reference to perform the proposed modification.

Applicant has pointed to examples in the instant specification that allegedly demonstrate that the instantly claimed resin composition provides the unexpected results of increased resolution and nano edge roughness. The examiner has considered the examples, but they are not commensurate in scope with the broadest claims. All of the inventive samples employ photoacid generators having both cations and anions that are preferred embodiments of the instant invention, and are actually claimed in dependent claims. The inventive samples also employ preferred resins of the instant invention, therefore the examples of the reference are not persuasive.

Art Unit: 1752

Therefore, the rejections of record over the Toshiaki and Watanbe et al references are maintained.

The objection to the instant claim 1 has been dropped in light of the amendment.

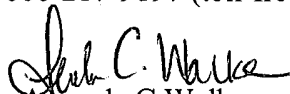
As discussed above, the rejections of claims 2 and 4 have been dropped in light of the filing of a certified English translation of the foreign priority document.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda C Walke whose telephone number is 571-272-1337.

The examiner can normally be reached on M-R 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Amanda C Walke
Examiner
Art Unit 1752

ACW
August 4, 2004